What is claimed is:

1.   A gradation correction curve creation method for creating gradation correction curves which define gradation correction of an image, comprising:

a patch output step of outputting, from an image output device, a plurality of monochromatic patches which are of a predetermined plain color and differ from one another in density and a plurality of gray patches which are of gray consisting of a mixture of plain colors and differ from one another in density;

a first measuring step of measuring a color-related first physical quantity of the plurality of monochromatic patches outputted from the patch output step and obtaining first measured values;

a second measuring step of measuring a color-related second physical quantity of the plurality of gray patches outputted from the patch output step and obtaining second measured values;

a first gradation correction curve creation step of creating a first gradation correction curve based on the first measured values obtained in the first measuring step and on first target values which represent color targets for the monochromatic patches;

a second gradation correction curve creation step of creating a second gradation correction curve based on the second measured values obtained in the second measuring step and on second target values which represent color targets for the gray patches;

a start position calculation step of calculating positions on the first and second gradation correction curves at which a gray component in a color mixture of plain colors starts to be replaced with monochrome black through an under-color removal process; and

a gradation correction curve combining step of combining the more shadowed side of the first gradation correction curve created in the first gradation correction curve creation step than the position calculated in the start position calculation step and the more highlighted side of the second gradation correction curve created in the second gradation correction curve creation step than the position calculated in the start position calculation step, and thereby creating a continuous third gradation correction curve.

2.   The gradation correction curve creation method according to claim 1, wherein the first physical quantity is density and second physical quantity is colorimetric values.

3.   A gradation correction curve creation apparatus that creates a gradation correction curve which defines gradation correction of an image, comprising:

a first gradation correction curve creation section which creates a first gradation correction curve based on first measured values obtained by measuring a color-related first physical

quantity of a plurality of monochromatic patches which are of a predetermined plain color and differ from one another in density as well as on first target values which represent color targets for the monochromatic patches, the plurality of monochromatic patches having been output from an image output device;

a second gradation correction curve creation section which creates a second gradation correction curve based on second measured values obtained by measuring a color-related second physical quantity of a plurality of gray patches which are of gray consisting of a mixture of plain colors and differ from one another in density as well as on second target values which represent color targets for the gray patches, the plurality of gray patches having been output from the image output device;

a start position calculation section which calculates positions on the first and second gradation correction curves at which a gray component in a color mixture of plain colors starts to be replaced with monochrome black through an under-color removal process; and

a gradation correction curve combining section which combines the more shadowed side of the first gradation correction curve created by the first gradation correction curve creation section than the position calculated by the start position calculation section and the more highlighted side of the second gradation correction curve created by the second gradation correction curve creation section than the position calculated

by the start position calculation section, and thereby creates a continuous third gradation correction curve.

4.   A gradation correction curve creation program storage medium containing a gradation correction curve creation program that runs on a computer and makes the computer create gradation correction curves which define gradation correction of an image, wherein the gradation correction curve creation program comprises:

a first gradation correction curve creation section which creates a first gradation correction curve based on first measured values obtained by measuring a color-related first physical quantity of a plurality of monochromatic patches which are of a predetermined plain color and differ from one another in density as well as on first target values which represent color targets for the monochromatic patches, the plurality of monochromatic patches having been output from an image output device;

a second gradation correction curve creation section which creates a second gradation correction curve based on second measured values obtained by measuring a color-related second physical quantity of a plurality of gray patches which are of gray consisting of a mixture of plain colors and differ from one another in density as well as on second target values which represent color targets for the gray patches, the plurality of gray patches having been output from the image output device;

a start position calculation section which calculates positions on the first and second gradation correction curves at which a gray component in a color mixture of plain colors starts to be replaced with monochrome black through an under-color removal process; and

a gradation correction curve combining section which combines the more shadowed side of the first gradation correction curve created by the first gradation correction curve creation section than the position calculated by the start position calculation section and the more highlighted side of the second gradation correction curve created by the second gradation correction curve creation section than the position calculated by the start position calculation section, and thereby creates a continuous third gradation correction curve.